

ORIGINAL ARTICLE

Validity, Reliability and Application of the Taiwan Version of the Migraine Disability Assessment Questionnaire

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Background/Purpose: The seven-item Migraine Disability Assessment (MIDAS) questionnaire is a simple and useful tool for evaluating migraine-related disability. The goals of this study were: (1) to test the reliability and validity of the Taiwan version of the MIDAS (MIDAS-T) questionnaire, and (2) to measure the impact of migraine among Taiwanese patients in a headache clinic.

Methods: Consecutive migraine patients, aged 20–50 years, visiting the headache clinic at the Taipei Veterans General Hospital were invited to participate in the study. They completed the MIDAS-T and a form, which collected headache-related information including characteristics and impact on their lives. Of them, about 30 patients were randomly invited to repeat the MIDAS-T 3 weeks later.

Results: A total of 281 migraine patients (M/F, 63/218; mean age, 35.27 ± 8.21 years) participated in the study. Of them, 31 completed the MIDAS-T again 3 weeks later. MIDAS-T showed acceptable internal consistency (Cronbach $\alpha = 0.79$), test-retest reliability ($r = 0.67$) and criterion validity ($r = 0.37$ for question A [headache frequency] and $r = 0.34$ for question B [headache intensity], $p < 0.001$). The mean score of migraine patients on MIDAS-T was 34.21 ± 45.90 , ranging from 0 to 265. MIDAS grade I (score 0–5) was found in 22% of patients, grade II (6–10) in 15%, grade III (11–20) in 17%, and grade IV (≥ 21) in 46%.

Conclusion: This study supports the reliability and validity of MIDAS-T for use in Taiwanese patients. Almost half of the migraine patients were classified as having severe disability (grade IV). [*J Formos Med Assoc* 2006;105(7):563–568]

Key Words: disability, MIDAS, migraine, quality of life

Migraine has a substantial impact on health-related quality of life (HRQoL) and has become an important health issue because of the resulting disability.¹ In Taiwan, the prevalence of migraine is 9.1%, which is comparable but in the lower range of the Western headache series (8–15%).² Because prevalence peaks during the most productive years, migraine is an important cause of lost work time. Studies conducted in Western countries consistently showed that about three-quarters of migraine sufferers had a reduced ability to function

during migraine episodes.^{3,4} The World Health Organization recognized severe migraine as one of the top 20 disabling disorders in the world.⁵ While epidemiologic studies and comorbid depressive and anxiety disorders have been well studied,^{2,6} there has been little study of characteristics of the disability in migraine sufferers in Taiwan.

The US Headache Consortium Guidelines emphasize the importance of assessing headache-related disability in the management of migraine, and the need to tailor treatment for patients

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through the development of individualized management plans.⁷ The three most frequently used headache-specific outcome measures are the Migraine Disability Assessment Score (MIDAS) questionnaire,^{8,9} the Headache Impact Test (HIT),¹⁰ and the Headache Disability Inventory (HDI).¹¹ All three questionnaires are easy for patients to complete; however, HIT and HDI are more difficult to score than the MIDAS questionnaire. The MIDAS questionnaire was first reported in 1999. It is a seven-item questionnaire that is designed to assess the impact of migraine on school work, paid work, household work, and family, social, or leisure activities over the past 3 months.^{8,9} It is easy to score. Previous studies showed that MIDAS has good reliability and validity in the original English version^{8,9} as well as in the Italian,¹² Japanese,¹³ and Turkish versions.¹⁴ Accordingly, MIDAS has become a popular and useful tool for evaluating migraine-related disability worldwide. A recent study using MIDAS found that MIDAS scores were substantially higher in migraine cases than in non-migraine cases.¹⁵

The results of the MIDAS scores can be grouped into four disability grades: grade I (minimal or infrequent disability), grade II (mild or infrequent disability), grade III (moderate disability), and grade IV (severe disability). A previous study suggested that incorporation of MIDAS into the US Headache Consortium Guidelines facilitated the use of stratified care strategies that were preferable to those obtained using the conventional stepwise approach.¹⁶ Initial treatment strategies can be adopted according to the extent of disability measured by MIDAS. This is in contrast to the previous practice in which initial treatment was nonspecific. A MIDAS grade can help physician-patient communication and can be used easily in daily practice.

The aim of this study was to assess the validity and reliability of the Taiwan version of the MIDAS (MIDAS-T) for migraine sufferers. We also evaluated the impact of migraine in a sample of Taiwanese patients in a headache clinic.

Methods

Patients

Consecutive new outpatients aged 20–50 years, who visited the headache clinic of Taipei Veterans General Hospital from April 2003 to June 2004, were enrolled. Patients in this age range were chosen because of the high prevalence of the condition in them. The original domains of MIDAS were also developed using a sample of this age group. Taipei Veterans General Hospital is a 2198-bed medical center in Taiwan. It serves both veterans and other citizens, and most of the patients come from northern Taiwan. The diagnosis of migraine was based on the criteria of the *International Classification of Headache Disorders, 2nd edition* (ICHD-II), 2004.¹⁷

All participants were evaluated by a headache specialist on their initial visit. All of them filled out a questionnaire, which collected demographic data, characteristics of the headache (frequency, severity presented on a verbal numerical scale [0–10], associated symptoms), and headache impact on daily life, work, and social activities. They also completed the MIDAS-T questionnaire. The Institutional Review Board of Taipei Veterans General Hospital approved the study protocol.

MIDAS-T questionnaire

MIDAS is a seven-item self-administered questionnaire (Table 1).^{8,9} The first five questions assess the influence of headache on three domains of activity over the preceding 3 months, and each of these items can have possible scores ranging from 0 to 90. The other two questions (A and B) were designed to provide the physician with clinically relevant information on headache frequency and pain intensity, and were not scored. The MIDAS score was obtained by totaling the scores for answers to the first five questions, ranging from 0 to 270.

Four disability grades were assigned based on the total score: grade I, total score 0–5, indicating minimal or infrequent disability; grade II, total score 6–10, mild or infrequent disability; grade III,

Table 1. MIDAS questionnaire

Instructions: Please answer the following questions about ALL the headaches you have had over the last 3 months. Write your answer in the box next to each question. Write zero if you did not do the activity in the last 3 months. (Please refer to the calendar below, if necessary.)

1. On how many days in the last 3 months did you miss work or school because of your headaches? days
2. How many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches (do not include days you counted in question 1 where you missed work or school)? days
3. On how many days in the last 3 months did you not do household work because of your headaches? days
4. How many days in the last 3 months was your productivity in household work reduced by half or more because of your headaches (do not include days you counted in question 3 where you did not do household work)? days
5. On how many days in the last 3 months did you miss family, social or leisure activities because of your headaches? days
- A. On how many days in the last 3 months did you have any headache (if a headache lasted more than 1 day, count each day)? days
- B. On a scale of 0–10, on average how painful were these headaches (0=no pain at all, and 10=pain is as bad as it can be)?

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total score 11–20, moderate disability; grade IV, total score 21 or more, severe disability.¹⁵

The MIDAS questionnaire was translated into Chinese for use in Taiwan (MIDAS-T) following the standard technique for cross-cultural research: translation, back translation, and bilingual expert panel evaluation.

Statistical analysis

All data were analyzed using SPSS version 11 (SPSS Inc, Chicago, IL, USA). For the analysis of test–retest reliability, 31 patients were asked to complete a second MIDAS-T 3 weeks after the initial evaluation. The response data to individual MIDAS-T questions and the overall MIDAS-T score were skewed towards higher values; therefore, Spearman rank correlation was used in the assessment of test–retest reliability. The internal consistency of the MIDAS-T score was assessed using Cronbach α . An α of 0.7 was considered acceptable; an α of 0.8 or greater was considered to indicate excellent internal consistency.¹⁸ The validity of MIDAS-T was assessed using criterion validity by comparing figures for the total MIDAS-T score with questions A (headache frequency) and B (headache intensity) in the MIDAS-T questionnaire, and other data collected at enrollment. A p value of less than 0.05 was regarded as the level of statistical significance.

Results

Demographic characteristics

During the study period, a total of 1070 consecutive new patients (353 males, 717 females; mean age, 47.24 ± 17.51 years) visited our headache clinic. Of them, 315 (29.4%) patients who were between 20 and 50 years old and had a diagnosis of migraine agreed to participate in the study. They completed the MIDAS-T questionnaire, the data collection form on demographics and headache characteristics, and underwent evaluation by a headache specialist. We excluded 24 patients who had incomplete data on their MIDAS-T and 10 patients with contradictory MIDAS-T answers (for example, the answers to questions 1 and 2 or 3 and 4 were each more than 90 days), yielding a final sample of 281 subjects (89.21%). Table 2 summarizes the demographic and headache characteristics of the study patients. Most of the patients were female and suffered from migraine without aura (93.95%). More than 60% of them had a paid job; 49 women (17.43%) were homemakers and 17 patients (6.05%) were students. Of the 281 patients, 31 (6 men, 25 women; mean age, 34.8 ± 9.8 years) agreed to participate in the test–retest reliability study and completed another MIDAS-T within 3 weeks.

Reliability

Cronbach α , a measure of internal consistency, was 0.79 for MIDAS-T in all study patients. Among the 31 patients who finished the repeated examinations, the test-retest reliability of individual

questions ranged from 0.48 (item 1: days missed from family, social or leisure activities) to 0.73 (item 5: days missed from work/school) and that of the total MIDAS-T score was 0.67 (by Spearman correlation test) (Table 3).

Criterion validity

The correlation coefficients for the MIDAS-T score with question A (total number of headache days) and with question B (headache severity presented by verbal numerical scale) were 0.37 ($p < 0.001$) and 0.34 ($p < 0.001$), respectively. The correlation coefficient of the MIDAS-T scores with questions on the headache data collection form (number of days of missed work or school because of headache in the past 1 year) was 0.45 ($p < 0.001$).

MIDAS-T mean score and grade distributions

Table 3 shows the mean score for each item and the total MIDAS-T score for migraine patients. The mean score was 34.21, with a range from 0 to 265. Thirty-three patients scored zero. The quartile scores were 6 for the 25th percentile (Q1), 17 for the 50th percentile (Q2), and 42 for the 75th percentile (Q3). Ninety percent of patients scored less than 80. Based on the MIDAS-T disability grades, 63 patients (22.3%) had grade I disability, 42 (15.0%) grade II, 47 (16.8%) grade III, and 129 (45.9%) grade IV.

Table 2. Demographic and headache profile characteristics of 281 patients with migraine

Characteristics		Range
Mean age, yr	35.27 \pm 8.21	20–50
Female, <i>n</i> (%)	218 (77.58)	
Educational level, <i>n</i> (%)		
Elementary school	23 (8.18)	
Middle school	31 (11.03)	
High school	92 (32.75)	
University or college	121 (43.06)	
Postgraduate	14 (4.98)	
Married, <i>n</i> (%)	169 (60.14)	
Paid job, <i>n</i> (%)	187 (66.55)	
Mean duration of migraine (yr)	12.92 \pm 8.42	0–42
Diagnosis of headache, <i>n</i> (%)		
Migraine with aura	17 (6.05)	
Migraine without aura	264 (93.95)	
Migraine frequency (d/3 mo)		
(Question A in MIDAS-T)	34.22 \pm 29.42	0–90
Mean headache intensity (0–10 scale)		
(Question B in MIDAS-T)	6.72 \pm 2.02	1–10

MIDAS-T = Migraine Disability Assessment Questionnaire – Taiwan Version.

Table 3. Mean individual items and total MIDAS-T score and Spearman correlation coefficients for test-retest reliability

Question item	Mean score of total sample (<i>n</i> = 281) (SD) (range)	Test-retest reliability (<i>n</i> = 31)		
		Initial MIDAS-T score mean (SD)	Repeat MIDAS-T score mean (SD)	Spearman's correlation coefficient (<i>p</i>)
1. Days missed from work/school	4.60 (9.86) (0–90)	4.16 (7.22)	2.82 (5.80)	0.73 (<0.001)
2. Reduced effectiveness days at work/school	8.17 (12.20) (0–86)	6.68 (8.11)	12.68 (16.19)	0.63 (<0.001)
3. Days missed from housework	7.09 (13.97) (0–90)	3.06 (4.42)	2.82 (4.72)	0.53 (0.02)
4. Reduced effectiveness in housework	8.03 (12.06) (0–90)	4.16 (5.33)	5.29 (7.35)	0.51 (0.003)
5. Days missed from family, social or leisure activities	6.51 (13.94) (0–90)	3.19 (4.01)	5.00 (8.69)	0.48 (0.06)
Total MIDAS-T score	34.21 (45.90) (0–265)	21.26 (23.00)	28.60 (27.10)	0.674 (<0.001)

MIDAS-T = Migraine Disability Assessment Questionnaire – Taiwan version.

Discussion

The MIDAS questionnaire has become one of the most important instruments for migraine impact assessment and management.^{8,9,12–14} The present study examining the reliability and validity of the MIDAS-T version were favorable. In the studies of the original English and other language versions of MIDAS, the test–retest Pearson or Spearman correlation coefficients ranged from 0.68 to 0.84 and the Cronbach α of internal consistency of the MIDAS score was 0.7–0.84. The reliability of MIDAS-T in this study is comparable to those reported in studies of the original English and other language versions of this instrument.^{8,9,12–14}

The test–retest correlation coefficients for household chores and for family, social and leisure activities were lower compared with those for paid work or school. This result might be due to the fact that paid work or school is usually more stable activities than family, social and leisure activities; therefore, the number of days missed for paid work or for school is more easily recalled by patients. The mean MIDAS-T scores for total days of paid work and housework missed were decreased, but the mean MIDAS-T scores for days of paid work and housework with a loss of more than 50% efficacy were increased. The reasons for why patients' headaches improved at the repeat test were not clear. There are at least two possible explanations, however. First, the patients' headaches might have improved after medical advice or treatment obtained at their first visit. Second, this result might just reflect "regression to the mean", i.e., the disability was most severe when the patients sought medical advice, and their headaches gradually recovered afterward.

As with previous studies on MIDAS,^{8,19} we found that the number of days of reduced productivity was greater than the total number of days lost. This implies that many migraine patients may feel that it is necessary to suffer from pain without taking any sick leave from work, even though their work efficacy is poor. Our results also showed that more days of housework were missed

than those of nonwork activity (family, social, leisure) followed by the number of work days.

Patients with migraine in our headache clinic suffered from a high level of functional disability. The mean score of MIDAS-T was 34.3, which was higher than the cutoff score (≥ 21) for the grade of severe disability (grade IV). Even though the 50th percentile of the MIDAS-T score was 17, 47% of patients with migraine had severe disability (grade IV, ≥ 21) according to their MIDAS-T scores in this survey. Therefore, on average, migraine patients in this study had suffered from very severe disability in the past 3 months before visiting the headache clinic.

The American DISC study suggested that patients with MIDAS grade II, III or IV would benefit from structured medical treatment.¹⁵ This group of patients comprised 78% of our clinical sample in this study, which suggests that most patients seen in a clinical setting would benefit from stratified care strategies rather than the usual step care program. Many patients with migraine seen at neurologic services should start migraine-specific treatment, either using abortive (such as triptans) or prophylactic agents as early as possible.

There were several important limitations to this study. First, the MIDAS questionnaire has been criticized regarding its domain designations.¹⁰ Although inability to work is likely to be highly correlated with inability to do housework and to participate in social and family activities, these are treated as separate domains in this questionnaire. Therefore, a single day of disabling headache may contribute more than 1 point to the total score. In addition, a 50% reduction in capacity is scored the same as complete inability to perform. The slightly longer period of assessment (90 days) for memory might introduce recall bias.²⁰ All these inherent limitations might bias the measure of the impact due to headaches. Further, as this study was conducted in the headache clinic of a medical center, one should be cautious in generalizing the findings to other patient populations in different clinical settings. For example, the frequency of migraine with aura (5.6%) in this study was

lower when compared with the proportions (10.7–46.6%) of patients having migraine with aura in other Asian epidemiologic surveys.² This low frequency probably resulted from sampling bias because patients with migraine without aura usually suffer from more severe disability.

In conclusion, this study demonstrated that MIDAS-T is a reliable, valid, and migraine-specific tool to assess headache-related disability in Taiwanese patients. We also found a high prevalence of disability (grade IV) among migraine patients in our headache clinic. This simple seven-item questionnaire is applicable as a tool to assess and treat migraine patients in Taiwan.

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